An International Perspective on CHP

Opportunities for an Environmentally Superior Technology

International Combined Heat & Power Symposium

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Outline

Key Influences

Climate Change is Happening

International Response to Climate Change

Opportunities - Trading and Technology Transfer

A Strategy to Advance CHP

A Key Influence:

Growing Energy Demand

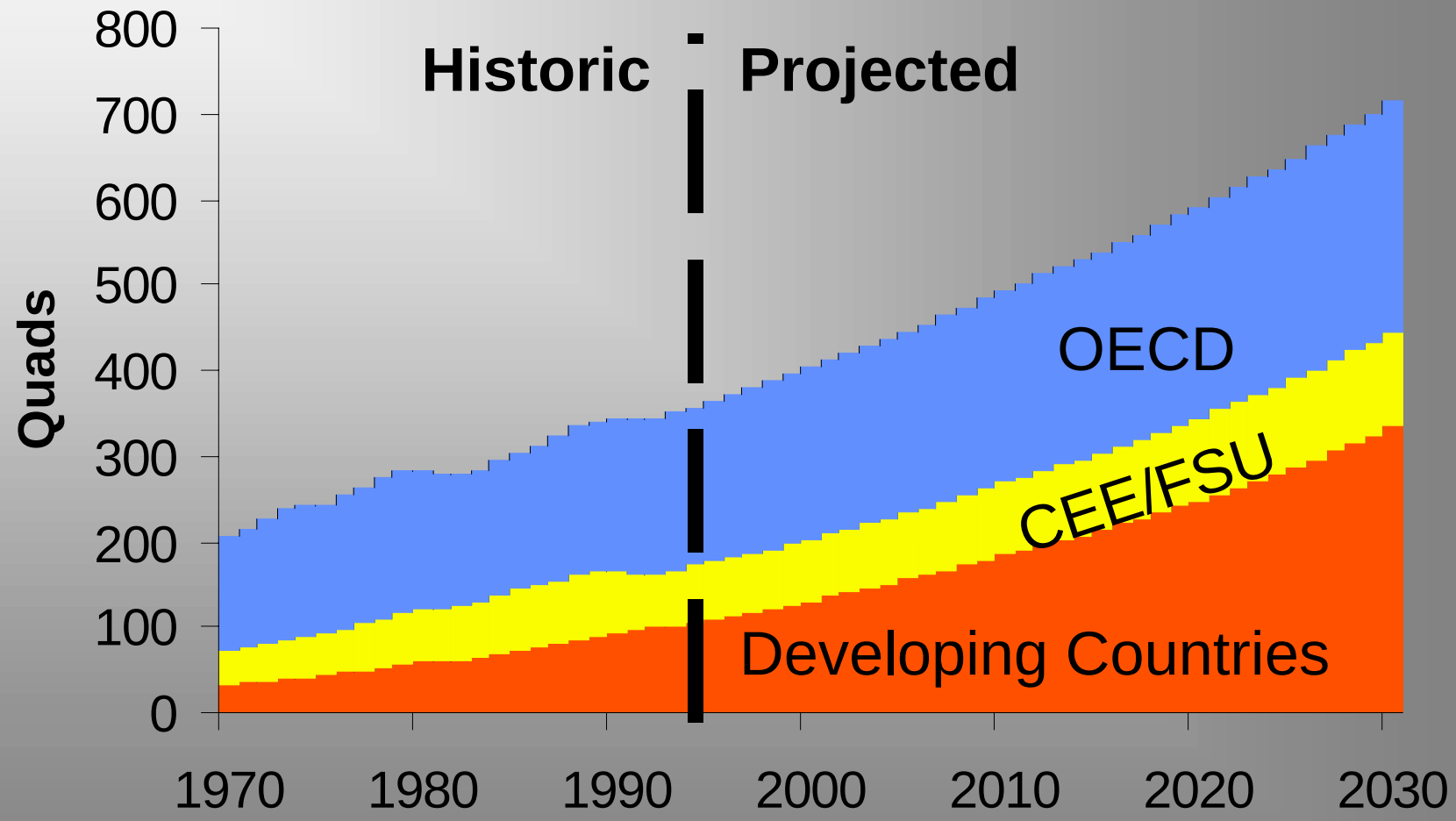
Historic

- China & Asian tigers: 10+ percent/year
- Other developing countries: 4+ percent/year
- OECD: 1.5 percent/year

Projected

- Developing countries: ~3 percent/year
- OECD: ~1 percent/year

Global Energy Situation



Sources: EIA, *Energy Use and Carbon Emissions Data -- non-OECD Countries*; and EIA, *World Energy Use, 1996*.

A Key Influence:

Markets Opening Up

Numerous trade agreements (GATT, Mercusor, NAFTA, EU, APEC)

Rapid increases in trade during the 1990's

Rapid growth (over 7%/yr) expected to continue

A Key Influence:

Power Sector Privatization/Deregulation

- Many countries privatizing
- Energy subsidies decreasing
  - making efficiency more attractive
- Competition for customers
- Competition among generators

Key Factors Effecting CHP

Demand for energy (reliability, quality)

Economic competitiveness

Privatization/restructuring

Opening markets/balancing trade

Unelectrified areas/electrification

Air quality

Climate change

A Key Influence:

Environmental Issues

Air quality

- multilateral projects
- regulations are gaining strength

Climate change

- Support for developing country activities
- Clean Development Mechanism
- Technology transfer

Simple Facts of Climate Change

Without greenhouse gases, earth would be 30°C (50°F) cooler

Concentrations of CO2 up 30% since 1750

80-85% of CO2 increase is from fossil fuels

Global warming is occurring

GHG concentrations could triple or quadruple

Warming takes time to begin, time to stop

Stabilizing GHG's requires global effort

The Response to Climate Change

- 1992 Framework Convention on Climate Change is law, but is weak
- Kyoto Protocol debate raging
- Scientific case is strengthening
- Business opposition to science decreasing
- Solutions are being explored

International Climate Change Response Infrastructure

- Thousands of negotiators
- Global Environment Facility ($2 billion)
- Growing multilateral effort
- Growing bilateral effort
- Clean Development Mechanism forming
- Technology Transfer pilots

Clean Development Mechanism & Joint Implementation

- Project based carbon trading well accepted
- Many issues being worked out
- Prototype Carbon Fund startup at $100m
- BP/Amoco, Shell start internal trading
- Pilot efforts beginning in India,Brazil, Mexico

Value of Carbon

Market could be large

- Global CDM market estimated to be $5-$10 billion/yr

Benefit to individual projects small in early years

- Energy efficiency project example:

  $1000 of electric energy savings/yr (12,500 kwh's)

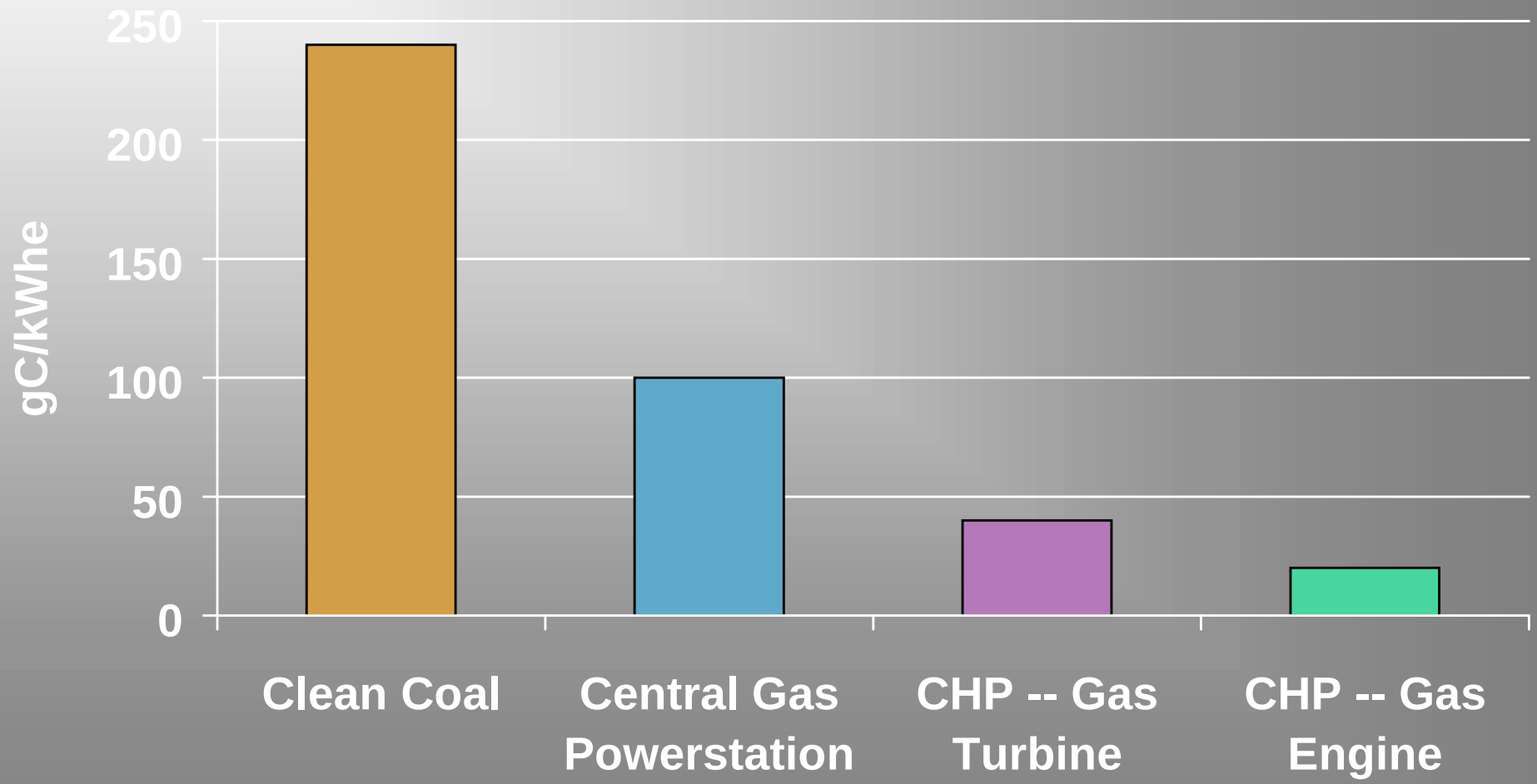
  3.3 tons carbon/yr = $66 @ $20/ton

Ensuring environmental benefit will create transaction costs

CHP Opportunity in CDM/JI

- Large projects can handle transaction costs
- Easily quantifiable reductions
- Many countries becoming eager to earn credits
- International support for pilot projects
- Visible to policy makers

CHP's Climate Advantage



Source: International Cogeneration Alliance, 1996.

Technology Cooperation Agreement Pilot Project

A Model for Technology Transfer under the FCCC

"*The developed country partners…shall take all practicable steps to promote, facilitate and finance, as appropriate, the transfer of, or access to, environmentally sound technologies and know-how to other Parties, particularly developing countries…*" Article 4.5 of the FCCC

Funded by USAID, USEPA, USDOE

TCAPP Goals

- Foster Private Investment in Clean Energy Technologies that Meet Development Needs and Reduce GHG Emissions
- Engage In-Country and Donor Support for Actions to Build Sustainable Markets
- Establish Model for Technology Cooperation Under FCCC

TCAPP

Principles:

- Host-Country Driven
- Primary Technology Transfer Mechanism - Markets
- Government Role is to enable private sector
- Success Requires Collaboration (among host-country agencies, governments, public/private sector)

Countries:

Brazil, China, Egypt, Kazakhstan, Korea, Mexico, Philippines, Southern Africa Development Community, maybe India

CHP Event on Feb 3

Brazil:

An Emerging Market for Cogeneration

Featuring Brazil Experts:

Jayme Buarque de Hollanda - Director of INEE

Howard Geller - Executive Director of ACEEE

Luiz Augusto Nogueira Horta - Director of ANP

9AM - @IIEC, 1015 15th St NW, Suite 600

Summary

Many factors encourage growth of CHP - the opportunity is now

Climate change is real

Climate change provides tools for CHP

Possible Strategy

Strengthen CHP and sustainable energy organizations.

Shape energy sector restructuring

Use climate change “tools” to gain attention from policy makers

Make CHP the premier technology for dealing with climate change

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